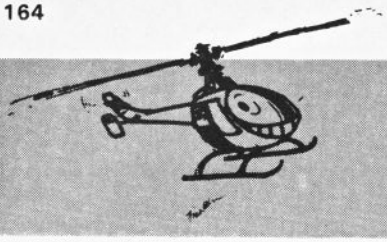

HOVERING ABOUT

THIS TIME LAST YEAR this column was trying to promote, or at least arouse and interest in scale helicopters at a time when all the emphasis seemed to be on trying to imitate multi-aerobatic models. Also it was evident that as the number of discarded models with very useful entrails increased, so would the number of interesting hybrids. Certainly the trend to scale has its following, with the "fly-in" type meetings, as always with helicopters especially, proving most popular. Perhaps the high spot of the 1979 season was the Bretons R/C scale fly-in at Hornchurch, but those at Halesowen, Preston, Norwich and Sale deserve a mention and promise to be equally popular in 1980. On the other hand, the SMAE events, the Nationals in particular, were very poorly supported. A demand for pre-entry and only allocating two frequencies for helicopter use, seems to be an adequate deterrent for the few entrants capable of serious competition flying. The Odiham meeting, which used to the THE event of the year crept nearer to winter, and experienced weather conditions that made helicopter flying almost impossible, and certainly unappetizing. Eventually the SMAE merged the event with the Southern Gala. I know of 'copter flyers who decided not to go, because their model was fixed on a frequency other than that allocated, and others, because their membership cards hadn't arrived, were unable to get in. The last meeting was the biggest farce of all, for when the dozen or so helicopter pilots turned up they found no allocation of frequencies or space. To be fair to SMAE, none had pre-entered since they didn't want to "compete" anyway, there must be a way round this. Can the BRCHA do anything to help?

This last non-event produced the most interesting hybrid of the year, when Roger Price from Burton flew his *Heli Toddler,* by invitation, at our home site after leaving Odiham in disgust. His models, christened at the meeting, as you may have guessed, were grown up *Heli Babies,* having been rebuilt to look like Heli Boys with similar characteristics. The tail rotor drive belt was replaced with two pairs of 1½ to 1 bevels to increase the speed of the tail rotor relative to the mast, and rotor modification comprised different blades and paddles.

Another successful hybrid was the MM "Lark" that Keith Whiddit flew in the third round at the '79 Nationals. This had amongst other mods reported previously, an old *Schluter* 'Cobra' rotor head.

Unfortunately a lot of successful modifying goes unnoticed, even when as in the Bretons event there is a bonus for initiative, it is just not pointed out. Is this modesty, secrecy, oversight of lack of appreciation of the significance? It probably comes back to the loner nature of helicopter pilots.

For 1980 we can look forward to the several specialist meetings if you are prepared to travel, and to continue the lonesome experimenting until you are brave enough to show your interest at your local club meetings. It really is a pity that many club members leave their 'copters at home when going to a club do, whereas they could surely add a lot to the variety, especially of scale events.

There is a compatibility problem, naturally the fixed wing flyers don't like an inverted rotoscythe buzzing about far too close in their flight path, maybe they have tried helicopters and don't think they are under control, and certainly it is very difficult to fly a helicopter from the same spot in the field that you would fly fixed wing, especially with fixed wing distracting you. It is true that the best helicopter pilots can cope with that problem but in the meantime, until all of us can, possibly the answer is to have a time slot for helicopters only, proportional to their numbers of course.

Above: the Model Flight Accessories Hughes 500D has a body shell that comes away in two halves to enable easy building and maintenance of the mechanics, but the tail rotor drive down the boom needs care. There is a shallow "S" bend as the drive goes up and to the side which can control the "whirling" and "wind-up" of the wire in this type of drive.

Practical experience

If you have a computer and are clever enough to use it you could work out some helicopter control problems. Others can be worked out from empirical formula derived from test rigs and flight measurements. On models most people makte it and try it.

John Griffiths of Slough Radio Control was so inspired by his *Bolkow BO 105* that he rapidly experimented with wire leading edges in the *Heliboy* (available as a manufacturers add-on set of parts) and on a *Jetranger.* He reports considerable success using 10swg (3mm) wire in the *Heliboy* and 8swg (4mm) wire in the *Jetranger,* bending the wire at right angles for 40mm at the root and moving the blade pivot point forward 2mm. The *Heliboy* rotor head is locked and fly-bar-less but the *Jetranger* standard head is unsuitable, he says, so the mod can only be done on the *Kavan* rigid head.

Competition flyers should not get too hooked on the system though, because currently metal leading edges are banned. My feeling is that the wire (at least it's blunt) won't make the blade more dangerous than any other of the same weight, and if making the blade function better, it is probably safer in the long run.

'Slough John' is also doing much to provide variety at next years meetings with his range of G.R.P. fuselage. The finished *Ecuriel* (we now all know the French for squirrel) looks very nice indeed and the *Lynx* will make an interesting model with sliding doors etc. Next on the list I understand will be the *Wessex* whilst I came away with the first *Puma* out of the mould. Nicely made, with lots of detail in the windows and doors — three pairs of wheels to retract on this one.

Due to my writing being even more ragged than my flying, one misprinted letter made a nonsense of my notes on clutches in the last H.A. Instead of the word 'of' came the word 'or', and for those that care, let me correct the error by saying that pressure at the clutch shoes matters very much, unlike size or area of contact.

Reluctant loners

A reader in East Sussex would like to meet up with fellow hoverers. He writes that he has had a year of breaking blades and glass-fibre fuselages on the mistaken philosophy of "get it clear of the ground and then sort it out", he then heard of and tried the "string method" from this column and was amazed to consume ½ gallon of fuel without breaking anything, though he has now very correctly realized that his equipment wasn't the best, i.e. slow servos in an old helicopter, and is doing something about it. So if you want someone to hold the string! Phil Titherington, 84 St. Mary's Avenue, Hailsham, Sussex is your man.

Another reader is so far out that he only expects pen friends, although in a town of some 200,000 and a relatively strong R/C following, there are probably only two helicopters. He complains of horrific expense of goods in the shops and long waits for ordered goods — I've heard that before — but anyone interested in a contact in that country should write to Andrej Nemac, 62000 Maribor, (Poste Restant) Yugoslavia.

Also support in establishing enthusiasm is wanted by Michael Cantlon, 590 River Valley, Swords, Co. Dublin, Eire. Building furiously but short on flying experience and success.

On tail rotor drives

The ideal situation for a wire drive is a gentle curve from one end to the other. This built in bias eliminates the phenomenon

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known as "whirling" between the bearings and so reduces the required number of bearings. This "whirling", caused when a minor out-of-balance force deflects the shaft out of shape, builds up to an incredibly stressful vibration, which, can, apart from the destructive vibration, cause a considerable tension on the shaft and play havoc with the thrust bearings in the gearbox, pulling these out of mesh and causing them to strip. Given a curve in the shaft, that can straighten out slightly, the tension that is caused by wind-up can also be absorbed. The tail rotor takes quite a lot of power at times, after all it's equivalent to an 11 x 6in propeller even if it is running at half engine-speed, and consequently the torque required will 'wind-up' the drive quite a bit, and if it's dead straight what is going to give? There is also the odd occasion when the engine is stopped by it, when landing in long grass or worse.

The major difficulty in setting up a wire tail drive, is making sure that the point going into the couplings is free of bending stress. On top of the stress caused by the drive torque, which it can cope with quite easily, a bending stress, caused by imperfect alignment, will fatigue the wire after a few flights; watch this point carefully. Fixing within the coupling is critical too, a hefty notch filed in for the grubscrew will create an obvious weak point, on the other hand a grubscrew (set screw if you prefer) unless locating on a flat is at a big disadvantage and probably won't hold. I prefer to see a hammered flat, and also use a good locking compound.

On multi-blade main rotors

Many readers ask about my experiments with the five blade rotor system on my *Sea King*. Truth is I haven't really any success to report, I like to think that this is due to lack of time, but it is just as likely to be due to my determination not to put 'Dum-Dum' bullets in the tips.

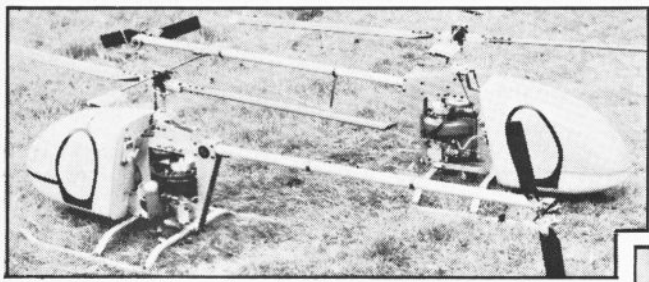
Schluter has used a clever way round this problem, for on his *Bolkow* BO 105 the blades are weighted with a wire built into the leading edges. This helps by shifting the C.G. of the blade further forward, relative to the centre of pressure, than is possible using a composite beech/balsa blade.

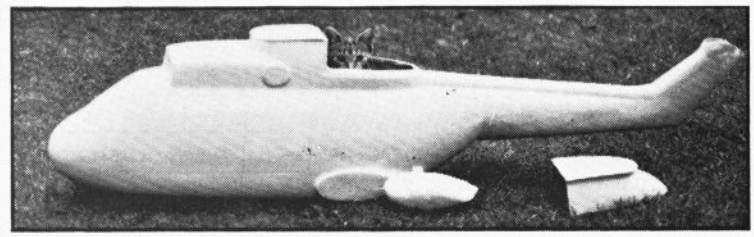
An aerofoil being forced through the air, apart from its better known lift and drag components, has a considerable pitching moment caused by the centre of pressure being in front of the C of G. This force tries to turn the aerofoil flat into the airstream instead of leading edge on. The force drags from negative to positive at or near zero incidence, depending on section, and reaches significant proportions actually twisting the blade. If the blade twists, it is not at the incidence demanded by the control system, quite apart from loading the sevos. Thus the control response will not come out correctly. In some cases it could be considered as a positive feedback into the servo system providing an increased sensitivity, unfortunately it stays on too late, and causes phase-lag problems. If we can arrange for the CG of the section to be far enough forward (even in front of the centre of pressure) then the "dart" effect will help considerably. I would suggest that copper wire would be the best and of course it should be bent round behind the pivot at the root and G.R.P. reinforced at that point.

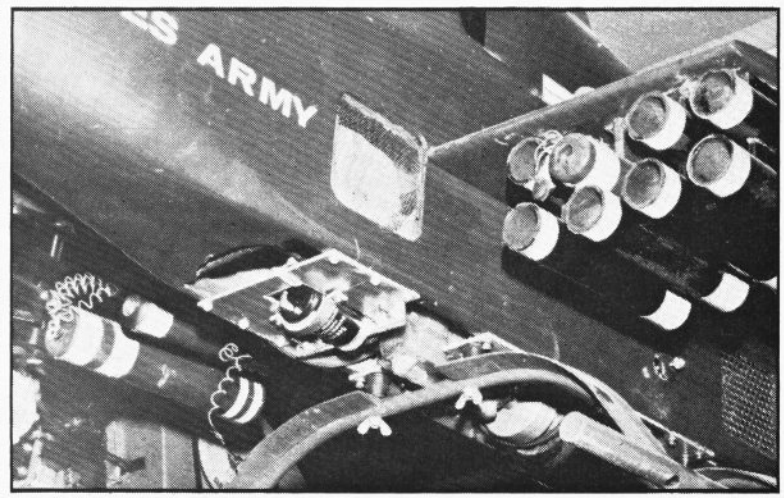
If you have a lead/lag hinge, then the lift centre being in front or behind the blade incidence pivot will also create a twisting moment. It may add to or cancel the above depending on whether the blade is the advancing or trailing blade in forward flight; but it is possible to make the weight of the blade pull it against the drag by moving the fixing forward. In other words, move the pivot towards the leading edge. The clever bit is deciding how much, and if, to do so, for when the blade is advancing or trailing.

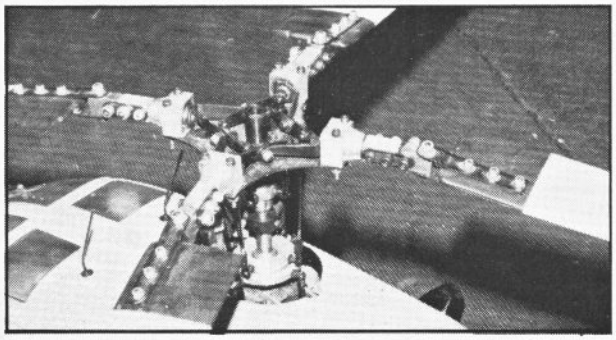
Compromise again.

Above: John Griffiths of Slough Radio Control is doing his part to improve variety this year by producing glassfibre fuselages. This is the Aerospatiale AS 350 Squirrel.









Above left: hybrid models at the Odiham meeting. Roger Price rebuilt Helibaby into "Helitoddler." Below left: the Schluter Bolkow BO 105 rotor head with the top plate removed. Variety for the summer displays and meetings. Slough Radio Control Models Puma glassfibre above right; and Cobra working rockets. Generator powers navigation lights and ignites rockets, below left.